WEEDS and TURF
PEST CONTROL

A SECTION OF PEST CONTROL MAGAZINE

SEPTEMBER 1962

A fixed nozzle on the bed of Naugatuck's demonstration spray unit covers a 20-foot swath with a spray of MH-30, new growth retardant.

"Mowing" Spans of Grass with Retardant MH-30

By DR. JOHN ZUKEL

Senior Researcher, Agricultural Chemicals, Naugatuck Chemical Div., U. S. Rubber Co., Naugatuck, Conn.

Inside demonstration truck, Naugatuck's Paul Bohne shows how remote controls are used to regulate spray equipment. Note low-speed speedometer mounted outside the cab, just to right of driver's head.

SPRAY TRUCKS equipped with hydraulically operated booms rolled along scores of miles of Massachusetts highways this spring, spraying the roadside grass. Motorists who observed the operation probably thought the highway maintenance men were killing weeds. Actually, that observation was only half correct. The spray crews were knocking out weeds all right, but with another ingredient in their combination spray they were "chemically mowing" the roadside grass.

Retarding the growth of grass along its highways with a chemical is now a regular highway maintenance practice in Massachusetts. The spray crews working this spring were finishing up a 440-mile grass growth-retarding spray program which the state got underway in the fall of 1961. The project's completion this spring meant that Massachusetts was now chemically retarding roadside grass growth on better than 1 out of 6 miles of its 2,400-mile highway system.

While this is the most extensive use of "chemical mowing" by a state, Massachusetts is far from alone in the application of this new roadside maintenance technique. Approximately 18 other

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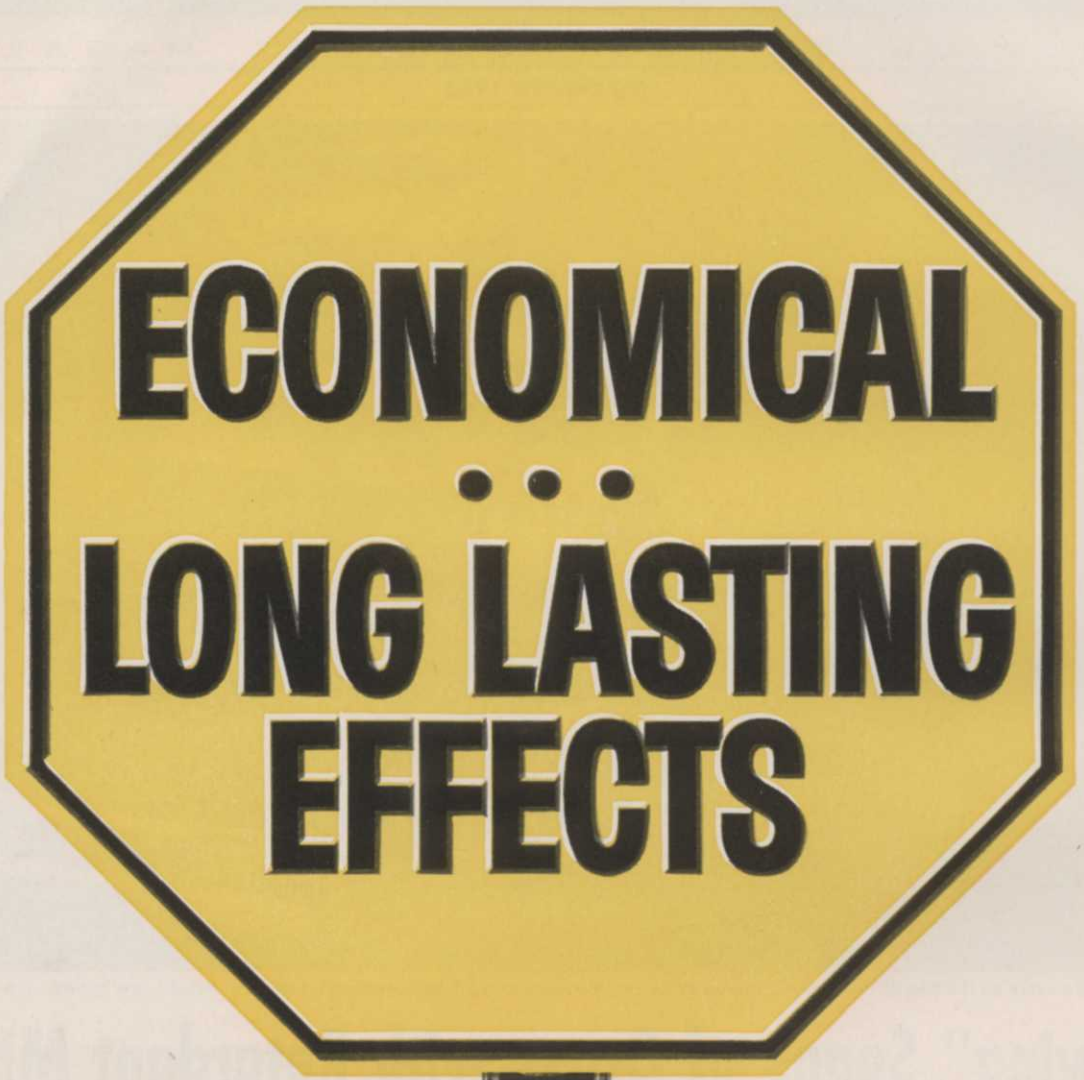

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states, plus the District of Columbia, used the chemical approach to grass trimming last year on a total of approximately 25,000 acres of grass.

In Use Since 50's

The chemical used is MH-30, or maleic hydrazide, a development of the Naugatuck Chemical Division, United States Rubber Co., which it patented in 1947. Its use on grass began, on an experimental basis, the following year. Highway departments — Connecticut was the first — began tests with the chemical on small plots during the early 1950's.

Massachusetts, probably among the first states to try the chemical, began its evaluation work on the chemical in 1953. "This experimental work was stepped up in succeeding years," said Masachusetts Public Works Commissioner Jack P. Riccardi recently, "and during the spring of 1961 we sprayed 65 miles of roadsides.

"The results of this extensive trial were so satisfactory, that full-

Contrast of treated (right) and untreated (left) grass is pointed out by Dr. John Zukel, a Naugatuck scientist who worked on MH-30.

scale use of the chemical began last fall."

Commissioner Riccardi put his finger on the reason for the mounting interest of state highway departments in chemical retarding of grass growth when he cited these results from use of the chemical in Massachusetts:

"Mowings have been reduced from 11 to 3 per season on certain median strips and exchange areas, and from 5 to 2 along some stretches of roadsides in Massachusetts. In addition, mowing grass along median strips — which

Refilling water tanks of the demonstration spray truck was no problem at all for the Naugatuck scientists. Here a stream in North Carolina is pressed into service.

can be hazardous work areas for mowing crews — can now be accomplished by spray operators working from the cab of a well-marked tank truck."

$50 Million for Roadside Mowing

Across the nation it is estimated that states now spend a staggering $50 million yearly to mow roadside grass. Faced with the prospects of this cost rising, as wages and other expenses mount, highway officials are working overtime to develop techniques which will cut down this tremendous budget item.

Many new highway systems now have extensive tree plantings at interchanges and other large areas. Several states are also experimenting with wood chip mulch as a grass substitute on slopes, or ground-hugging shrubbery. But these devices have yet to make any appreciable dent in roadside maintenance costs. Every state has thousands and thousands of acres of grass along its highways, and this grass must be kept trimmed.

The cost of mowing this grass varies from state to state, and also from location to location within a state. Some states have their own mowing crews, others contract the job either wholly or in part. Per acre mowing costs can be well under $20 in some instances, and can climb as high as $500 per acre in other situations. The high water mark in mowing costs is reached on steep slopes, where mechanical equipment cannot be utilized and the job has to be done — several times each season — with costly hand labor.

By contrast, it is estimated that MH-30 can retard the growth of an acre of grass — no matter what the degree of the slope — for approximately $20. That figure includes cost of the chemical and the expense of application.

Only one application of the chemical is required for a growing season, and it can be applied either in the spring or fall. In areas where close trimming is required, the spray is generally supplemented with one or two mowings. On slopes at interchanges, and on

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Growth-retarding MH-30 rolls over roadside grass on a North Carolina highway. Naugatuck says about 25,000 acres in 18 states will be sprayed with MH-30 this year in a massive effort to cut the staggering $50 million paid yearly by states to keep roadside grass trimmed.

steeply pitched banks at cut-throughs or elevated sections of the highway, a single application — without supplementary mowing — would suffice.

There are several ways to apply the chemical, which is a liquid and must be mixed with water before being sprayed. Over the past two years Naugatuck Chemical has used special demonstration spray trucks to show these various techniques to highway officials throughout the country. The trucks contain 5 different pieces of spray apparatus.

Applicator Trucks Described

On both sides of the flat beds of these trucks are fixed nozzles, angled to cover up to 30 feet, which are used to spray median strips and roadside areas. T-jet nozzles in the 80° series are used. These fittings are spaced 10 inches apart on the boom, and the width of the grass strip being sprayed determines the number of nozzles used. Two larger, fixed nozzles, mounted on the tailgate, cover broad areas such as interchanges.

A boom rig, which sprays a 22-foot swath, is used for road shoulders or medians. It has a series of spray heads, and at the boom's end is a small outrigger wheel to keep the spray heads a fixed distance above the grass.

Mounted on the body of the trucks is an air-carry sprayer, which has been converted for MH-30 use. Its big fan can move up to 50,000 cubic feet of air per minute, and this air volume is funneled through a rubber diaphragm and tear-shaped hood. Spray nozzles in the hood's open end feed the spray mixture into the air stream. The blower can be swung through a 360° arc, and aimed up or down a total of 90° from controls on the truck's back, to spray long slopes. Also operated from the platform on the trucks is a high pressure hose used to clean up in hard-to-spray areas such as bridge abutments.

Controls in the cabs of the trucks can turn all of the spray equipment on and off and similar controls are mounted on the rear platforms. The hose, and air-carry, are controlled from the rear platform, and an intercom system is used to keep contact between the driver and the operator on the rear platform.

The trucks have a 500-gallon spray tank; a gasoline-operated filler pump to draw water from streams and ponds; a low-speed speedometer used to keep the truck at the 10-mile-per-hour, or slower, speed used when spraying; seat belts for the driver and his passenger-operator, and flashing identification lights used to warn traffic while spraying.

Some of this apparatus has been adopted by state highway departments. In some states, such as Massachusetts, the equipment used has been designed by highway engineers or on-hand spray equipment has been adopted for MH-30 use.

The necessary equipment requisites, as outlined by Naugatuck Chemical, are: (1) special low-speed speedometers, since standard truck speedometers are generally inaccurate at the speeds used to apply the chemical. The speedometers used in Naugatuck's demonstration are made by the Franks Manufacturing Company of Mentone, Ind. Another manufacturer is the Stewart Warner Company. (2) A centrifugal pump with a 100-gallon per minute capacity, plus an off-center nozzle is recommended for spraying up to 30 feet swathes. Naugatuck used pumps made by the Myers or Pacific Pump Companies. No model number is listed because several models made by both companies could be used. The only requirement is that the machines be capable of pumping 100 gallons per minute. This same pump, incidentally, is used to operate all the spray equipment on Naugatuck's demonstration trucks, including the air-carry machine. (3) For treatment of areas beyond 30 feet, and up to 70 feet, the modified air-carry machine is recommended. Naugatuck is helping applicators to obtain information on new equipment and equipment conversion for this type of spraying.

Timetable

As previously mentioned, the chemical can be applied in either the fall or spring. In the northern states spring applications should be made between May 1 and June 1, and fall applications between September 15 and October 30. Timing will be somewhat different for other sections of the country, depending on grass-growing conditions.

Naugatuck does not recommend MH-30 for grass-growth inhibition in either the Deep South or the Southwest. All of the research work so far has been done in the Northern area, Middle Atlantic States, the Midwest, and the Northwest. The atmospheric conditions in these areas, particularly the average rate of humidity, is favorable to the use of MH-30. Here is what we recommend for these areas: In the Northeast, Middle Atlantic States, and the Midwest, the time for spring spraying is between April 15 and May 20. Fall application should be made between September 15

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and November 15. In the Northwest, spring application should be made during the month of April; and the fall application can be made between October 15 and November 30.

The chemical should be sprayed on established turf. The grass should be green at the time since brown grass will not absorb the chemical. It should also be 2 to 4 inches in height.

Naugatuck Chemical recommends that 1⅓ gallons of MH-30, mixed with 50 gallons of water, be used per acre of grass under standard conditions. This dosage will markedly reduce the number of mowings required per season, especially if it is applied at the time suggested. For difficult-to-mow areas, where a further cutback — or the complete elimination — of mowings is desired, it is suggested that 2 gallons of the chemical be applied per acre along with 50 gallons of water. It is possible to mix some weed killers, such as 2,4-D, with MH-30 in order to do the double job of weeding and growth retarding at the same time.

The growth-retarding effect of a spring application will be visible in about a week's time, at which point the chemical will be well distributed within the grass plants. Its retarding effect generally lasts until summer dormancy sets in.

When grass is sprayed with MH-30 in the fall, the chemical is retained in the plant over the winter dormancy period, and then takes effect in the spring as regrowth begins. Fall-sprayed grass generally greens up about one or two weeks later than unsprayed grass.

A rain within 12 hours after spraying will reduce the chemical's effectiveness since the water-soluble chemical is still being absorbed into the grass during this period. After 12 hours, when the chemical has been absorbed, rain has no effect on its performance.

How MH-30 Works

When sprayed on grass the chemical is absorbed through the grass plant's leaves, or blades. It then moves through its vein systems to the point where growth is taking place. Here, it blocks cell division — the growing process in which one plant cell splits in two, and the two in turn split into two more. By blocking this multiplication-through-division process the chemical halts upward growth. Frequently, then, the plant's growth impetus shifts to secondary growth points and side growth is promoted. As a consequence, MH-30 sprayed grass is frequently thicker and greener than unsprayed grass.

More than a decade of testing has shown MH-30 to be a safe chemical. It has no effect on humans, animals or birds, and will not harm grass when applied according to recommendations. It is also a nonvolatile chemical, and consequently does not create drift problems.

A commercial chemical since 1957, MH-30 is also used to prevent the growth of sucker shoots on tobacco plants, prevent runner growth of strawberry plants, increase the frost resistance of citrus trees and prevent potatoes and onions from sprouting in storage. It has been approved for use on food products by the Food and Drug Administration.

It is not, however, presently suggested as the answer to the lawn mowing problems of homeowners. For even results, the chemical must be applied at a carefully controlled rate and at a near-constant speed. Naugatuck Chemical suggests, for example, that spray equipment to be used for MH-30 be carefully calibrated before an actual spraying job. Since such equipment is not available to the homeowner, the chemical is not recommended for full lawns.

However, for roadside grass and other large grass areas — such as cemeteries, plant areas, tank farms, airports, etc. — MH-30 now represents a proven method for reducing grass-cutting costs.

Miller Opens Peoria Branch

A new branch office of the Miller Chemical Company, Omaha, Nebraska firm which numbers lawn and garden chemicals among its products, has been opened in Peoria, Ill.

W. D. Brooks of Peoria is general manager of the new branch. He was formerly associated with American Cyanamid Company, and other chemical firms.

Chinch Bugs Moving to Midwest; Here's Way to Identify Them

Chinch bugs, though primarily a southern menace, are visiting Midwestern lawns in untold numbers. The insects suck the life from grass blades, leaving faded, strawy patches.

It is difficult to distinguish chinch bug damage from a fungus disease, such as dollar spot, unless the inspector gets down on his hands and knees for a close examination at the base of damaged blades. The bugs are generally found along the outer edges of discolored patches.

Complaints of chinch bugs often come in combination with leaf hopper and clover mite damage. One very accurate method of locating and identifying the source of trouble is to remove the top and bottom of an ordinary soup can and press the can partly into the turf at the margin of the patch. Fill with water until the bugs float to the surface. Make the test in several places if necessary.

Chinch bugs are little more than a speck, flat, and less than 1/6th of an inch long, even in the adult stage. Tiny nymphs are red, then turn brown with a white dot or band and, when mature, have distinct black and white markings.

The hairy chinch bug has short wings, while the ordinary variety has wings extending the full length of the abdomen.

Chinch bugs ignore plants outside the grass family. Their favorite foods are corn, grain crops, and turfgrass.

Brown patches caused by chinch bugs often have a reddish cast in the center, turning yellowish along the outer portions.

Nymphs and adults begin sucking during warm June days, primarily in sunny spots. Nymphs take about 30 days to mature. During the 20 to 30 day adult period, eggs are laid for a second brood that appears about August and lives and feeds until cold weather.

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How to Use New Pre-Emergent Herbicides in Turf

Developed mainly for agricultural use, pre-emergent herbicides offer unlimited opportunities for contract applicators. But with new preparations and new techniques come new problems. When to use a pre-emergent herbicide, and which one will work best, are questions which will face every CA sooner or later.

Action of pre-emergent chemicals takes place before seedlings have emerged from the soil, so that seeds are destroyed while they are sprouting. Several products have been cleared for the market, and many more are being tested for performance.

Weeds are fast growing and maturing. Many times post-emergent treatments are applied too late. Such "late" applications destroy grown weeds, but the seeds will already have been shed for the following year. It's like "closing the barn door after the horse is gone." Proper use of a pre-emergent herbicide practically assures that there will be few if any susceptible weeds left that year. Obviously, chemicals for pre-emergent control must be applied well before any weeds are seen. Geographical differences and weather conditions affect the time of germination, so application time will not be optimum for all applicators during the same months.

As opposed to conventional post-emergent treatment, pre-emergent chemicals kill unseen weed pests. Differing from soil sterilants, and nonselective post-emergent preparations, the action of pre-emergent herbicides is highly selective. That is, pre-emergent herbicides kill only sprouting seeds of weeds without hurting established turf. In this way, desirable turf is left unmarred by crabgrass and other unsightly weeds. Pre-emergent treatment may be recommended for any contract that calls for prevention of weeds: lawn turf, golf courses, highways, cemetaries, parks, etc.

For this discussion we shall cover only generalities about the chemicals, and specifics about their use for controlling crabgrass (*Digitaria sanguinalis* and *D. ischaemum*, hairy and smooth crabgrass respectively) on turf, although most of these new chemicals control many noxious weeds.

Some of the chemicals shown to be satisfactory for crabgrass control are: Bandane (Velsicol); Dacthal (Diamond Alkali); Diphenatrile (Elanco); Dipropalin (Elanco); Tricalcium arsenate (Chipman); Trifluralin (Elanco); and Zytron (Dow). All of these do the job they were designed to do, but in many cases they are designed to do a variety of jobs.

Results of granular applications are more consistent than liquid treatments, and granules are easier to handle and apply. There is less danger of making a mistake than CAs may find when mixing a concentrate in water. Mistaken mixtures may result in a strength of application greater than recommended. Granular application, provided the recommended rate of pounds per acre is followed, safely assures the operator of a good job.

Two problems face contract applicators who are turning more and more to pre-emergent chemicals for turf jobs, this article points out. First, new chemicals must be understood and evaluated. Second, customers must be persuaded to buy control of weeds they can't see.

Fertilizer Cheap P-E Carrier

In general, all the pre-emergent herbicides are compatible with fertilizer and may be applied over or with such a soil builder. In addition to being one of the cheapest carriers, fertilizer helps form a tight, solid mat of grass, which further prevents weed infestation. One point should be noted at this time. Excess phosphorous may tie up or block the action of herbicides, so if the fertilizer contains phosphorous, test phosphorous content of the soil to avoid over dosages which might affect the herbicide.

Contract applicators, then, should know the advantages of pre-emergent control, the various herbicides involved, and the situations in which these chemicals are used.

Pre-emergent control has many advantages over post-emergent control. When chemicals are properly applied at the beginning of the growing season, competitive weeds do not spring up. Turf and ornamental nutrition is not impaired by unsightly weeds. When crabgrass is left in a lawn, "brown-out" occurs in the fall when crabgrass begins naturally to die out. When crabgrass is killed in the spring, there are no holes in the lawn such as are left by this weed when it dies in the fall.

Pre-emergent treatment is economical because, in most cases, less chemical is required. It is also a laborsaving method because normally only one treatment is necessary for complete seasonal control. During germination, tender young shoots are in a very active state of development and growth. At this time they are most susceptible to herbicide action. Chemicals released from the surface of granular carriers by rain or irrigation, or applied in solution, attack these weed sprouts while they are still in the soil, thus eliminating later trouble and expense.

P-E Less Likely to Harm Turf

Since pre-emergent herbicides are selective for seeds and seedlings, turf injury by chemicals is not a problem for most grasses when pre-emergent chemicals are used in the spring. Also, since pre-emergent chemicals do not act on surface contact there is no danger of injury to adjacent shrubbery.

Exact species of turf grass should be determined before treatment is begun, because some are

more sensitive to herbicidal treatment than others. Also, the exact safety margin of each chemical must be fully recognized because some herbicides affect these delicate grasses more than others. If the species cannot be determined, a test should be made on a small portion of the grass to ascertain the plant's reaction. Some turf grasses which may be expected to react unfavorably to treatment are fescues, bents, and bluegrass.

Species of the infestation should also be determined because some of the pre-emergent herbicides are not effective against all of the grassy weeds, and few of them are effective against broadleafed weeds. No guarantees for complete weed removal should be made until the capabilities of the chemical and the target weeds are known.

Size and scope of the contract, along with available equipment, will help decide whether to use a liquid spray of, for example, 5 gallons of active ingredient per acre, or a granular type which may require 400 lbs. of active ingredient per acre.

When to Apply P-E Chemicals

Some pre-emergent herbicides work best when applied in spring; others produce optimum results when applied in fall. A few will work satisfactorily at both times. This fact gives an operator a chance, while working on a fall job, to begin "booking" other customers for spring applications, if heavy infestations are noted. It follows that if pre-emergent herbicides do not prevent broadleafed weeds, an additional treatment with contact post-emergent herbicides, applied to broadleaves before they produce seed, will result in a satisfied, weed-free customer.

To work well, a pre-emergent herbicide must be with the seeds at germination time. Fine particles of chemical cling to the soil and contact seeds as they sprout. If the soil is too porous, the chemical may leach down too far and be ineffective. A heavy soil can usually hold a liquid treatment satisfactorily, but on a more sandy soil a granular preparation may work better. A muck soil, high in organic content, may tie up the herbicide and more chemical would

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925 PRO Stainless Steel Sprayer

2 quarts usable capacity; stainless tank (2⅔ qts. full capacity). Has same general features as 904 sprayer illustrated above. 3 ft. vinyl core hose, braided stainless steel wire cover and vinyl outer casing. All parts are easily removed and cleaned.

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908 PRO Stainless Steel Sprayer

Stainless steel tank, 2 gallon usable capacity. Smooth stroking seamless brass pump easily removed for fast filling. Positive dripless nozzle shutoff. 4 ft. vinyl core hose, braided stainless steel wire cover and vinyl outer casing. Shut-off has easy clean Monel strainer. 9" angled extension with fan-pattern nozzle quickly removed from shut-off valve housing.

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be required for effectiveness. This shows the necessity for knowing soil types.

Following is a discussion of some important new pre-emergent herbicides.

Bandane

Bandane (polychlorodicyclopentadiene) as a granular formulation applied in a pre-emergent treatment gives good crabgrass control. At 30 lbs. per acre, Bandane has shown no injury to established turf grasses. Of crabgrass materials, Bandane is one of the least phytotoxic to turf. Tests indicate that when used at crabgrass control rates, Bandane will also control ants and grubs in the soil. This chemical is safe to handle according to mammalian toxicity studies.

Dacthal

Dacthal (dimethyl 2,3,5,6-tetrachloroterephthalate) is sold in various concentrations and on a number of carriers for different uses. It has a recommended application rate of 10 lbs. active ingredient per acre, and gives good pre-emergence control of crabgrass, foxtail, witchgrass, purslane, common chickweed, carpet weed, and lambsquarters. Residual effects of Dacthal often last through one season, it is claimed, but the compound does not retard germination of desirable grass seed if reseeding takes place after about 5 weeks. It is also said to be safe for use in proper amounts on seedling grasses of freshly landscaped areas given the same safety margin of 5 weeks.

Diphenatrile

Diphenatrile (diphenylacetonitrile) is available as an 11.5% concentration on a vermiculite carrier, or a 5.5% strength on a fertilizer carrier, as well as other formulations. Applied at 30 to 40 lbs. active ingredient per acre, diphenatrile prevents germination and growth of crabgrass, goosegrass, and green or yellow foxtail. It is not effective against seedlings of broadleafed weeds, however. Established bluegrass, fescue, bentgrass, zoysia, Bermuda grass, centipede grass, and St. Augustine are all tolerant to diphenatrile.

Dipropalin

Dipropalin (N,N-di-*n*-propyl-2, 6-dinitro-4-methyl aniline) is related to trifluralin, but differs by three flouride atoms. Applied at 4 to 6 lbs. active ingredient per acre, it has given excellent control in tests of crabgrass, yellow and green foxtail, and goosegrass. It is considered safe for use on freshly planted landscapes.

Tricalcium arsenate

Basic rates for *tricalcium arsenate,* using a 48% granular concentration, are 18 lbs. per 1000 square feet. If a 73% concentration is used, only 12 lbs. per 1000 square feet are needed. This compound, researchers have said, may have a residual effect of up to one year. In addition, tricalcium arsenate will also control grubs and worms in the soil, killing most of them. Tricalcium arsenate should be applied when foliage is dry. If the chemical is dissolved by moisture on leaves, it may act as a contact herbicide and damage the plant. Arsenicals must be used cautiously because they are toxic to other organisms.

Trifluralin

Trifluralin (N,N-di-*n*-propyl-2, 6-dinitro-4-trifluromethyl aniline) concentrations vary, but it is usually obtained on a vermiculite carrier, and is applied at 1.6 lbs. of active ingredient per acre. Trifluralin is not recommended for pre-emergent control on freshly planted areas. This compound will control all the weeds mentioned for its relative, dipropalin, without injury at recommended rates, to established grasses such as bluegrass, bentgrass, Bermuda grass, zoysia, and St. Augustine. This compound also has a good residual rating.

Zytron

Zytron (O-(2,4-Dichlorophenyl) O-Methylisopropylphosphoramidothioate) is formulated as a 4.4% concentration on an organic carrier, among others. The granular form of Zytron, applied at 15 lbs. active per acre, has shown to work as well on turf as the liquid form of the same chemical. Zytron has a residual effect of several months, but it may delay germination of fresh turf seed. This results in what researchers call "excellent" control on established turf. Caution must be observed with Zytron in that it has an effect upon the sensitive grasses. In addition to crabgrass, Zytron can control foxtails, barnyardgrass, goosegrass, pigweed, purslane, smooth and mouse-eared chickweed, henbit, and oxalis. Zytron can be applied in winter or early spring. Zytron has been researched and used commercially for more than four years.

Researchers advise that turf be established about 5 weeks before any seeded landscapes are pretreated for crabgrass with the above chemicals. In all cases mentioned here, label directions will be the best guide to successful pre-emergent treatment.

Pre-emergent weed control is new and it needs more advocates. They will come when experience and information based on this efficient type of treatment is more widespread.

One of the major problems still to be solved, and it has nothing to do with technology, is to overcome customer apathy towards buying control of weeds they can't see. But when this idea is sold successfully, contract applicators will find many pre-emergence applications can be made in winter or spring when business might otherwise be slow.

Changes Mark New Century Pump

A stainless steel shaft, extended so power take-off slides over it with greater support, is one new feature of the 1962 Century 8-nylon-roller spray pump, manufactured by Century Engineering Corp. With this extension, the shaft can also be used for pulley or motor operation, the manufacturer says.

Price reductions in the 8-nylon-roller pumps mean PCOs can get increased gallonage output, increased agitation, and increased pressure, for prices comparable to 6-roller pumps, Century claims.

PCOs desiring more details may write Century Engineering Corp., Cedar Rapids, Iowa.

Carter Guide Available

Carter Insecticide & Chemical Co. has a complete guide on its soil fumigant applicators available to interested CAs. Applicators, kits, methods, and mixtures are described. For a free copy, write to P.O. Box 209, Wallace, N. C.

Meeting Dates

Midwest Turf Field Days, Purdue University, Lafayette, Ind., Sept. 10-11.

Eighth Annual Nurserymen and Growers Short Course, University of Florida, Gainesville, Sept. 20-21.

Horticultural Spraymen's Assn. of Florida Annual Convention, Hotel Deauville, Miami Beach, Nov. 8-10.

North Central Weed Control Conference, Hotel Lowry, St. Paul, Minn., Dec. 3-5.

Northeastern Weed Control Conference, Hotel New Yorker, New York, N.Y., Jan. 9-11, 1963.

Southern Weed Control Conference, Admiral Semmes Hotel, Mobile, Ala., Jan. 16-18.

California Weed Control Conference, Santa Barbara, Jan. 22-24.

Aquatic Weed Control Society Annual Meeting, LaSalle Hotel, Chicago, Ill., Feb. 12-13.

Malathion Recommended To Control Scale Insects

Second generations of scale insects can be controlled now with chemicals such as malathion, Dr. Donald L. Schuder, Purdue University research entomologist reports.

Small, and frequently inconspicuous, scale insects suck sap from ornamental shrubs and trees. Newly hatched scale insects, called crawlers, are susceptible because they are not yet protected by a waxy covering, Schuder says.

While about 80 different kinds of these insects occur, four are particularly subject to control in midsummer. They are the brown race of oystershell scale, pine needle scale, juniper scale, and eunoymus scale.

All of these can be controlled by spraying with malathion, Schuder says. Recommended usage is 2 to 4 teaspoons of 57% emulsion concentrate per gallon of water. Other insecticides Schuder claims effective against scales include Diazinon, Guthion, and Ethion. Regardless of the insecticide used, Schuder recommends adding a wetting agent, such as household detergent, to insure contact with the insects.

He also reports that malathion can be used to control euonymus scale, but this insect is harder to control because it has three generations per year. He advises repeated spraying at 7 to 10-day intervals after the initial crawler spray, continuing until late in September.

USDA Book Details Tree Ills

Preventive measures for dealing with diseased or potentially diseased trees, as well as many major tree afflictions, are described in a new booklet from the U.S. Department of Agriculture.

Titled "Tree Diseases of Eastern Forests and Farm Woodlands," the publication lists major trees found in eastern forests, with diseases to which each is most commonly subject, and lists recommended action. All tree abnormalities other than those caused by insects are included in the term "tree diseases."

CAs may obtain copies from the Forest Service, U.S. Department of Agriculture, Washington 25, D.C.

Residex Offers 1962 Catalog

A 1962 Herbicide Catalog, featuring prices and technical information on 19 herbicides used in industrial weed control operations, is available to CAs from Residex Corp.

Residex has specialized in supplying industrial herbicides since 1954, the firm says, and handles formulations with technical material supplied by chemical companies such as American Cyanamid, Dow, DuPont, and Geigy.

CAs may obtain a copy of the free catalog by writing the company at P.O. Box 816, Clark, N.J.

Calif. Town Says No to Weeds

Nearly 147 vacant lots in the city of Coalinga, Calif., must be cleared of weeds right away, or owners face a municipal fine.

City rulers termed the weeds a "public nuisance and fire hazard," and city workers were made available to perform the work if no private applicators were called in. In either case, expense of the weed destruction is to be borne by the property owner.

—W & T Mailbox—

Welcome Contribution

Congratulations on the first edition of *Weeds and Turf*. As president of the Weed Society of America, I am sure that all weed control scientists and weed control specialists in research, teaching, extension, and regulatory work welcome the important contributions you have made and will make in the future to the discipline of weed control.

The *Weeds and Turf* section is well planned, well organized, well written, and the significant contributions in this section clearly presented.

I am especially pleased about the amount of space given to announcements on the activities of WSA and the Regional Weed Control Conferences. I hope you will continue to encourage your readers to attend these meetings, which give an enormous amount of excellent fundamental and practical information having a direct bearing on the contract applicator's business.

Congratulations again on an important contribution to more effective use of agricultural chemicals.

Dr. W. C. Shaw

Leader
Weed Investigations-Agronomic Crops
Crops Protection Research Branch
Agricultural Research Service
U. S. Dept. of Agriculture
Beltsville, Md.

Very Much Impressed

I have just seen a copy of your magazine on the desk of a customer of mine, and was very much impressed.

Although I am in the marketing end rather than the application end of weed control and turf care, I find there are many interesting articles in your publication.

William A. Freeman

Niagara Chemical Division
FMC Corporation
Richmond, Calif.

Weeds and Turf welcomes expressions of opinions from its readers. Send ideas and comments briefly as possible to Charles D. Webb, Editor, Weeds and Turf, 1900 Euclid Ave., Cleveland 15, Ohio.

Know Your Species

SMOOTH CRABGRASS

(Digitaria ischaemum)

Smooth crabgrass, sometimes referred to as summer grass, or finger grass, is a troublesome annual that reproduces by seed and by rooting at the nodes (joints) near the base of stems. It is generally found in lawns, uncultivated areas, and crops, on light sandy soil across Eastern North America, but it is locally common elsewhere. The smooth type is sometimes confused with large crabgrass *(D. sanguinalis)*, which is taller, coarser, with hairy leaves, and is less purplish.

Stems of *D. ischaemum* are smooth and many branched, forming prostrate mats. Leaves are alternate (not directly opposed on the stem), and smooth, 2 to 12 cm. long, 3 to 6 mm. wide. Seeds are borne in two rows on one side of 3 to 10 branches that appear to radiate from the top of the upright stem. The spikelets or single flowers are about 2 mm. long. Chafflike bracts (sterile parts) which enclose the spikelets are dark brown with transparent margins.

Crabgrass begins growth only when the soil is quite warm, usually in May in northern areas, and in April southward. It flowers and sheds seed in August and September. Crabgrass grows so vigorously during the hot summer when turf grasses are under partial dormancy, that the weed tends to crowd or shade out desirable grasses.

Disodium monomethyl arsonate (DMA) when applied 3 to 7 lbs. of active ingredient per acre at weekly intervals for 2 to 3 weeks gives good control. Likewise, phenyl mercuric acetate (PMA) applied as a post-emergent spray at a rate of ½ to 1½ lbs. per acre controls crabgrass infestations.

If a heavy infestation is expected in the spring, Zytron, Dacthal, or trifluralin, applied according to directions before the crabgrass germinates, are said to effect control throughout the summer.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

DRAWING BY REGINA HUGHES, USDA, BELTSVILLE

Ill. Survey Supports Diquat For Aquatic Weed Control

Investigational reports from widely separated parts of the United States have indicated that Diquat is an effective herbicide for the control of aquatic weeds, according to a report from the Illinois Natural History Survey. Conclusions reached are that Diquat is quite toxic to tested aquatic weed species, and has a rapid action. In laboratory tests with bluegills, no fish deaths occurred at rates of 20 ppm. or below, the survey claims.

Diquat, marketed commercially by Ortho Division of California Chemical Co., is an aqueous solution containing 2.8 lbs. of Diquat dichloride. It has been approved for aquatic weed control by the Pesticide Labeling Division of the U.S. Department of Agriculture.

CAs may receive a copy of the Illinois report, plus a copy of the test graph, by writing to the Illinois Natural History Survey, Section of Aquatic Biology, Urbana, Ill., and asking for "The Chemical Control of Some Aquatic Weeds — Supplement No. 2."

Magnolia Debuts New Pesticides

Magnolia Chemical Co., producers of nursery and garden center pesticides, is currently introducing four new formulations, including Bug Bait, Rose and Flower Dust, Lawn Spray, and Leaf Gloss.

Rose and Flower Dust, containing Dithane Z-78, is particularly effective against black spot, the firm claims. It is recommended for use as either a dust or as a water-diluted spray.

Interested CAs can write to the company at P.O. Box 8043, Dallas, Tex., for descriptive literature.

New Label Clearance for Simazine

Additional registrations for Simazine 80-W, which now extends use of the chemical to include nurseries, Christmas tree plantings, and shelter belts, has been revealed by Geigy Agricultural Chemicals Division, which manufactures the chemical.

Copies of the label acceptance are available to operators who write the firm at P. O. Box 430, Yonkers, N.Y.

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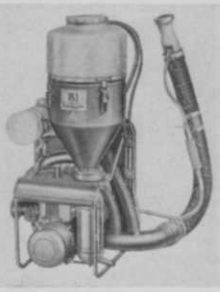

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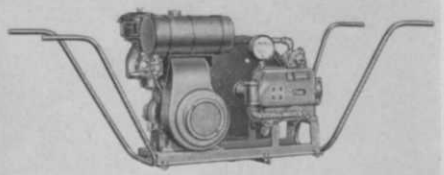

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Book Review

The Chemistry and Mode of Action of Herbicides

by A. S. Crafts, Interscience Publishers, New York, N. Y., 1961. 269 pp. $9.00.

A much needed reference for the ever-improving field of chemical weed control is *The Chemistry and Mode of Action of Herbicides* by Dr. A. S. Crafts, Chairman of the Department of Botany at the University of California at Davis.

Though mainly a chemical reference, the author reviews, in the first five chapters, biological aspects of chemical treatment and the classification of herbicides according to their action upon weeds. Pictures of plant parts, which have taken up dyes and radioactive Carbon 14, illustrate absorption and movement of herbicides through plants.

Remainder of this work is an elaboration on the many groups of chemical compounds, from 2,4-D, which heralded a new weed control era, to Zytron, one of the most recent. Each discussion begins with structural illustrations of the compounds concerned, which gives a chemically inclined reader an idea of the relationships between chemicals and why they act in similar or different manners. Pertinent research related to each compound discussed is cited, and the mechanism of action upon plants, as far as it is known, is explained. Charts summarizing many research efforts are found throughout the text.

Dr. Crafts writes in a fluent manner which makes for easy reading, but technical terminology is used. On that basis this book is not recommended to the novice in chemistry, unless he is willing to devote serious study to the subject. No space is given to defining terms; instead this space is used for citing references.

Persons with training in organic chemistry will find this book a very good review, and one which will keep them abreast of herbicide research.

Since the beginnings of weed control were agricultural, this text is oriented in that direction, but it will prove useful to the urban vegetation controller as well. Discussions of chemical turf weed control, while not extensive, are also included.

Sudbury Offers Free Booklet

Information on soil testing, including sections on soil elements, pH preferences, and fertilizing, is available in a new booklet, "The Good Earth," offered by Sudbury Laboratory, manufacturer of soil testing kits used to determine chemical composition of soil.

For a free copy, write Dept. 411, Sudbury Laboratory, Sudbury, Mass.

Members of the Horticultural Spraymen's Association of Florida met recently with the editors of *Weeds and Turf* to discuss mutual industry problems and map future plans for upgrading weed control business practices. Pictured above (left to right) are HSAF members William Murray, Charles Johnson, Pierre Nobs, Thomas Stokes, Elizabeth Newell, and Thomas Hamall. Hamall is state publicity director for the Florida group. Here the group examines a completely outfitted spray rig designed by Nobs for his contract spray business.

Trimmings

Onward and upward. **Veteran weed controller Dick Evans, proud president of Dick Evans, Inc., a pioneer in the industry, writes that he's moved company headquarters to Pampa, Tex., where he'll direct activities for the firm's several branches. Dick was one of the first to specialize in refinery and pipeline contracts for the oil corporations, and reports he has such giants as Phillips and Skelly on his books. We're glad to hear this success story from the Panhandle State, which bears out our prediction of the business boom this industry is now experiencing.**

* * *

Kitchin moves up. Another weedman on the advance is Dr. John T. Kitchin, formerly extension horticulturist at the University of New Hampshire. Dr. Kitchin has been named chairman of the University of Rhode Island's horticulture department.

* * *

Meade meets for weed meet. **Northeastern Weed Control Conference secretary Dr. John Meade reports he and president Don Schallock are getting together with other NEWCC mentors in September to map final plans for the forthcoming conference in New York this January. We're glad to know everything is progressing on schedule for this industry conclave, which gives CAs a welcome chance to visit the big city, and update themselves on the latest chemicals and techniques the NEWCC scientists are testing.**

* * *

Better guard the yard. Just heard of a Chicago butcher who came home the other evening, happily planning a cookout with his family, to discover his lawn was gone. Having worked long and hard over his prize turf, the butcher was understandably shaken. A quick quiz of the neighbors, who stood around shaking their heads sympathetically, revealed a suspicious-looking character had spaded up the yard, rolled up the sod, and sped away in a long, black truck. Our mystified butcher then wandered around the neighborhood in a daze and found another recently spaded plot, whose owner was industriously seeding and raking to beat the band, and who told the deprived butcher that he had ordered his lot plowed up by a nearby gardening company. Further investigation turned up the culprit, a gardener who sheepishly admitted he'd gone to the wrong address, and spaded up the butcher's yard by mistake. He said he was sorry, and promised to bring the lawn back right away.

* * *

Stan's plans. **Versatile Cornell researcher Dr. Stanford Fertig is about to launch a big new aquatic weed control research program, we learned recently. Dr. Fertig is laying out a series of one-tenth acre ponds to try new herbicides on, and will certainly come up with valuable information for the applicators. The program is still on the drawing board, and we'll have a more complete progress report in a later issue.**

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